pt. 2 pts without history of SVTA, but with inducible SVTA developed later spontaneous SVTA.

Conclusion: ARVD was associated with a significantly higher incidence of inducible SVTA than in a control population. Supraventricular tachycardias may precede ventricular tachycardias. This association argues for a diffuse myocardial disorder in ARVD.

1228-172 Catheter Ablation for Common Atrial Flutter: Randomized Comparison at the Two Right Atrial Isthmuses

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Background: It is now accepted that radiofrequency ablation (RFA) can abolish common atrial flutter (CAF) based in an anatomically guided approach. However, two target sites have been used and the current experience remains limited. These critical sites are two isthmuses localized at the low right atrium: Posterior isthmus (P) = Tricuspid annulus-Inferior Vena Cava and Septal isthmus (S) = Tricuspid annulus-Coronary Sinus Ostium.

Methods: We prospectively compared the RFA at these 2 isthmuses in 22 consecutive patients (p), randomized alternatively to one of them (11 p to P and 11 p to S). The RFA was always performed during CAF and a 7F quadripolar 8-mm tip catheter was used. Ablation success was defined by: (1) the termination of the CAF due to isthmus block during the RF current application, and (2) the inability to reinduce CAF for a period of at least 30 minutes by programmed stimulation of the right atrium, isoproterenol infusion included, and (3) the demostration of a complete bidirectional isthmus block. According to study protocol if RDF failed at one isthmus after the fulfilment of 3 complete lines along it, the RF was applied in the other one.

Results: Procedure duration was similar at the two sites: 139 ± 42 (P) vs 150 ± 29 (S) and also fluoroscopic time: 38 ± 13 (P) vs 44 ± 28 (S). Transient high degree AV block during RFA ocurred in 4 pts (1 at P and 3 at S) and was coincidental to severe chest pain in all of them. Success at the first choice was obtained in 6/11 at P and in 7/11 at S and at the another isthmus in 4/5 at P and in 3/4 at S so the total success was 90% (20/22). The remaining two patients fulfilled the two first criteria of success but it was only possible to produce unidirectional isthmus block. During a 5-month mean follow-up, CAF only recurred in 3 of 20 p who had a successful ablation. 3 p experienced atrial fibrillation that needed antiarrhythmic therapy.

Conclusions: RDF of CAF seems equally effective and safe at the posterior and septal isthmus. We have not found significant differences between the two methods in our initial results so they could be complementaries.

1229 Leads, Drugs, and Clinical Application of Implantable Cardioverter Defibrillators

Wednesday, April 1, 1998, 3:00 p.m.–5:00 p.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 4:00 p.m.–5:00 p.m.

1229-173 Time Course of Intensified Follow-up Phase of the Medtronic 7217b Pacemaker Cardioverter Defibrillator (PCD)

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Background: Intensified follow-up of the Medtronic 7217B PCD is recommended when the battery voltage (BV) declines to 5.25V and continues until an elective replacement indicator (ERI) (BV = 4.97V or charge time = 11 sec) is reached. The mandated monthly or bimonthly evaluations of BV and charge time (CT) places burdens on patients, increases demands on clinics and diminishes battery longevity.

Purpose: To determine if alternate patient visit schedules could be safely used during the intensified followup phase of the 7217B PCD.

Methods: BV and CT were measured in 11 patients with 7217B PCD's during intensified followup. The ERI parameter was noted.

Results: The mean duration of the intensified follow-up phase was 18.0 months (range 15–22). Device use was moderate as four patients had a total of 8 shock therapies during this phase. In 9/11 patients BV was used as the ERI. Significant prolongation of CT was not seen until BV's of 5.04V were reached. Evaluation of various BV cutoff points (see graph) revealed that the mean time from a BV of 5.07V to ERI was 11.1 months (range 6–13). The mean time to ERI from a BV of 5.04V was 4.6 months (range 3–7).

Conclusions: In patients with 7217B PCD's, intensified followup schedules can be safely deferred until BV declines to 5.07V. A cutoff of 5.04V may also be acceptable in some patients. This should reduce the number of patient visits and the reduced need for CT measurement may prolong battery life.

1229-174 Performance of the Lead System for the Metrix Automatic Implantable Atrial Defibrillator

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Stability and chronic performance of the lead system is critical to ensure successful atrial defibrillation. In the Metrix clinical trial, atrial defibrillation thresholds (ADFTs) were measured at implant and at the 3-month follow-up using a up-down protocol to obtain two consecutive successes and failures. The average of these two values was defined as the ADFT. In 51 patients (pts), a three lead system was implanted and connected to the Metrix device (model 3000 or 3020): an active fixation lead with a 6 cm defibrillation coil in the right atrium (RA), a passive 6 cm defibrillation coil in the distal coronary sinus (CS) and a tined bipolar lead in the right ventricular (RV) apex. The model 3000 (N = 17 pts) used a 3/3 ms and the model 3020 (N = 34 pts) a 6/6 ms biphasic waveform. For this reason, the model 3020 was capable of delivering twice the amount of energy although the maximum deliverable voltage was the same for both devices.

Results:

	ADFT at implant	ADFT at 3-month
Model 3000	206 ± 51V (1.53 ± 0.74J)	220 ± 47V (1.76 ± 0.63J)
Model 3020	193 ± 39V (2.66 ± 1.08J)	190 ± 51V (2.72 ± 1.46J)

Analysis using only the paired ADFT voltage data showed no significant difference in ADFT between implant and 3-month [p = 0.85 for both models combined (N = 24), p = 0.21 for model 3000 (N = 10) and p = 0.26 for model 3020 (N = 14)]. Power analysis determined that there was 99% power in the data to detect a 50 V difference in ADFT voltage should one have existed. During follow-up of 259 ± 138 days, 6 pts required lead repositioning: RA lead in 3 pts due to an acute increase in defibrillation requirements, RA and RV lead dislodgment in 1 patient each, CS lead in 1 patient in a small cardiac vein.

Conclusions: Initial clinical experience showed that the lead system for the Metrix atrial defibrillator has been stable with no significant acute to chronic changes in ADFT. Complications seen with this lead system are similar to those observed with other implantable devices.

1229-175 Biphasic Endocardial Defibrillation Raises the Pacing Threshold in a Steroid-eluting ICD Lead

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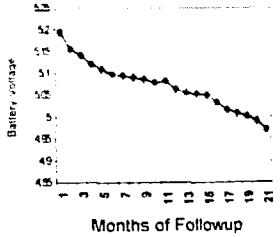
Background: There is debate as to whether the pacing threshold increases following implantable cardioverter-defibrillator (ICD) shocks. We sought to investigate whether the post-shock pacing (PS) threshold increased significantly in an endocardial, steroid-eluting lead with dedicated bipolar pacing electrodes.

Methods: Twenty patients (16 men, 4 women, median age 73, EF 0.17 to 0.58) were studied during pectoral ICD implantation (Medtronic model 7221 cx or 7223 cx [active can] with model 6932 lead). The diastolic pulse width pacing threshold at 1 or 2 volts was determined. Pacing rate was set 100/minute at twice diastolic threshold output to assess pacing immediately following the first DFT test shock. For subsequent shocks, the output was adjusted to establish PS thresholds as 1, 2, 3, or 4 times the diastolic threshold. The PS threshold was defined as the output yielding 100% capture 2.5 seconds following a shock.

Results: In 8 of 20 patients (ratio 0.40 ± 0.11), a rise in the PS threshold was shown by failure of consistent capture when pacing at 2X diastolic threshold 2.5 seconds after a DFT test shock. Two of these patients failed at 3X threshold, but none failed at 4X. Five of 12 patients with successful capture at 2X failed to capture at threshold. The PS threshold increased by a mean factor of 2.83 ± 0.83 in the group of patients with a threshold rise.



Mean BV vs. Time

Conclusion: Following ICD shock in an active-can, steroid-eluting lead system, the PS threshold increases significantly. This demonstrates a need for post-shock pacing to be set at least 4X threshold.

1229-176 Comparison of Transvenous and Unipolar Defibrillation Thresholds

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Background: With pectoral defibrillator placement, the pulse generator shell can serve as an active electrode with simple single coil lead systems. However, the effect on defibrillation threshold (DFT) and mechanism of action of this unipolar configuration compared with a dual coil transvenous lead is not well understood.

Methods: This was a prospective study of lead configuration on biphasic DFTs in 50 consecutive patients implanted with a dual coil lead (Endotak DSP). The shocking cathode was the distal right ventricular coil and the anode was either the proximal coil (Lead) or a left pectoral emulator (Unipolar). Paired DFTs were measured by step down with the order randomized. Delivered energy (E), peak voltage (V) and current (I) and shock impedance (R) were measured at DFT.

Results: The patient population was 74% male with a mean age of 63 ± 14 years and an ejection fraction of 31 ± 13%. Overall, there was a 16% reduction of energy and 23% reduction of current at DFT in the unipolar configuration, while shock impedance increased.

	E (J)	V (Volts)	I (Amps)	R (Ω)
Unipolar	9.0 ± 5.1	352 ± 88	6.5 ± 1.0	57 ± 11
Lead	11.8 ± 6.2*	379 ± 91*	8.5 ± 2.5*	46 ± 9*

*p < 0.05, **p < 0.01

Conclusion: The unipolar configuration reduces DFT compared with a dual coil lead despite an increase in shock impedance. The reduction is likely due to the optimization of the shocking vector resulting in a marked decrease of peak current at DFT.

1229-177 Antiarrhythmic Drug Use in the Implantable Defibrillator arm of the Antiarrhythmics vs Implantable Defibrillators (AVID) Study

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AVID was a randomized comparison of the implantable cardioverter defibrillator (ICD) and antiarrhythmic drugs (AAD) in patients (pts) with VF, syncopal VT, or VT with symptoms and EF < 0.40. Pts randomized to ICD were strongly discouraged in AAD use; thus AVID pts provide an unusual opportunity to explore the need for AAD use, and its effects, in an ICD population. In AVID 470 pts were discharged with ICD alone, of which 87 (19%) had AAD added at median of 165 days post-implantation. Pts were 64 years old, 74% male, 78% CAD, and 43% were on beta-blocker. The reasons for addition of AAD were: frequent ICD shocks (N = 50), recurrent ventricular arrhythmias (N = 23), recurrent SVT (N = 6) and other (N = 8). In 36/19/32 pts, amiodarone/sotalol/other-AAD respectively, were added. The time to first ICD therapy was significantly delayed after AAD was started: at 1 year, 86% of pts had ≤1 ICD therapy pre-AAD vs only 58% post-AAD (p < 0.0001). In addition, the number of ICD therapies was less post-AAD: pts had 2 ± 5 fewer ICD therapies in the 3 months post-AAD compared to the first 3 months after implantation.

Conclusion: Most ICD pts can be managed without AAD. Frequent ICD shocks sometimes require addition of AAD. These baseline controlled observations suggest that AAD usage may reduce the frequency of subsequent ICD interventions.

1229-178 Bolus Administration of Intrapericardial Ibutilide: Its Dynamic Effect on Myocardial Refractory Period and Defibrillation Threshold

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Objective: To evaluate the dynamic effect of a therapeutic bolus administration of ibutilide (IB) in the intrapericardial (IP) space on the ventricular (V) defibrillation threshold (DFT) and on the endocardial atrial (ARP) and V (VRP) effective refractory periods.

Methods: In each of six dogs, under a limited thoracotomy, a 3.6F catheter was advanced through a pericardial incision into the IP space and the pericardium was sealed around the catheter. The chest was then closed. Before (CONT) and throughout 343 ± 19 min. after a 10 μg/kg IB infusion, an ICD lead system (RV → SVC' + Can') and catheters in the LV apex and RA free wall were used to determine the VRP, ARP and DFT every 14 ± 21, 14 ± 23, and 53 ± 12 min. (mean ± sd), respectively.

Results: The VRP and ARP (CONT = 172 ± 3 and 164 ± 6 ms, respectively) were observed to increase in 6 ± 3 and 7 ± 1 min. post-drug, and reached maxima of 201 ± 3' and 196 ± 6' ms in 29 ± 3 and 32 ± 3 min., respectively. Thereafter, the VRP and ARP in each animal returned to CONT levels with similar timecourses that appeared exponential (all animals: 80 < τ < 260 min.). The DFT (CONT = 294 ± 32 V) decreased to a minimum value at the time of the first measurement post-drug (250 ± 27' V at 53 ± 5 min.) and returned to a level near CONT with a similar exponential timecourse (274 ± 29'' V after 325 ± 22 min.).

Conclusions: IP administration of IB significantly reduced the DFT with a timecourse that paralleled the increase in myocardial refractoriness. These data indicate that low levels of ibutilide, administered in the IP space, may be useful as an adjunct therapy for the treatment of tachyarrhythmias.

Data are presented as mean ± sem. *p < 0.01, **p = ns vs. CONT.

1230 Valvular, Pericardial, and Congenital Heart Disease: Insights From Echocardiography

Wednesday, April 1, 1998, 3:00 p.m.–5:00 p.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 3:00 p.m.–4:00 p.m.

1230-113 Can Flow-dependent Aortic Stenosis Be Predicted From the Analysis of Valve Kinetics During Ejection?

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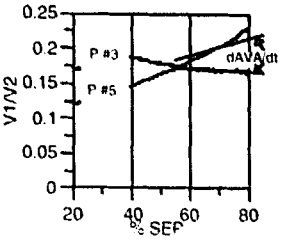
Background and Methods: The analysis of valve kinetics during ejection may help identify patients with flow-dependent aortic stenosis (AS). Therefore, we analyzed high-quality Doppler-spectrum images of the LV outflow tract (V1) and aorta (V2), from 15 patients with AS. Digital signals from 3–8 beats were averaged to improve envelope delineation. To enhance modal velocities, the look-up tables of V1 recordings was changed from grayscale to color. Doppler envelopes were traced and baseline curves of valve area during ejection were obtained from instantaneous V1/V2 ratios. The change of valve area (AVA) was obtained as dAVA/dt, and was averaged for early, mid and late systole. These baseline parameters were then screened for an association with the ΔAVA induced dobutamine infusion, using bivariate analysis which also considered the Δ in flow.

Results: AVA curves disclosed different patterns of valve opening at baseline (see figure). In some patients (e.g. P# 5) AVA continuously increased throughout systole; in others (e.g. P#3), AVA early peaked and then remained constant. These patterns were related to the ΔAVA which took place with dobutamine: an inverse correlation was observed between late-systolic dAVA/dt and the ΔAVA induced by dobutamine (p = 0.02; R = 0.85; ΔAVA = 29% and 9% for P#3 and P#5, respectively).



Conclusions: The analysis of AVA dynamics allows identifying different patterns of AS and may help to exclude flow-dependent AS without the need of pharmacological interventions.

1230-114 Utility of Automated Stroke Volume Determination Method in the Assessment of Aortic Valve Orifice Area by the Continuity Equation in Patients With Aortic Stenosis: Comparison With Invasive Data

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Background: The Continuity Equation (CE) as currently employed to assess